

# Microcredit and the Poorest of the Poor: Theory and Evidence From Bolivia

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## Abstract

We construct a theoretical framework that puts the social worth of a microfinance organization (MFO) in terms of the depth, worth to users, cost to users, breadth, length, and scope of its output. We then analyze evidence of depth of outreach for five MFOs in Bolivia. Most of the poor households reached by the MFOs were near the poverty line—they were the richest of the poor. Group lenders had more depth of outreach than individual lenders. The urban poorest were more likely to be borrowers, but rural borrowers were more likely to be among the poorest.

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## Authors' notes

This is an extensive revision of the paper "Does Microfinance Reach the Poorest of the Poor? Evidence From Bolivia". This was an extensive revision of "Do Microfinance Organizations Reach the Poor in Bolivia?", itself an extensive revision of "Poverty and Microfinance in Bolivia". Schreiner is a post-doctoral fellow in the Center for Social Development at Washington University in St. Louis. Navajas and Rodriguez-Meza are doctoral candidates, and Meyer and Gonzalez-Vega are professors, in the department of Agricultural, Environmental, and Development Economics at The Ohio State University.

# Microcredit and the Poorest of the Poor: Theory and Evidence From Bolivia

## 1. Introduction

The professed goal of public support for microcredit is to improve the welfare of poor households through better access to small loans. Often public funds for microfinance organizations (MFOs) carry a mandate to serve the poorest (Consultative Group to Assist the Poorest, 1995). For example, the Microcredit Summit in February 1997 rallied support to seek more than \$20 billion to provide microcredit to 100 million of the poorest households in the next ten years (Results International, 1996).

Microcredit is the newest darling of the aid community. In Latin America, most of the excitement is based on the fame of a few of the best MFOs. These include BancoSol, Caja Los Andes, PRODEM, and FIE in Bolivia; Caja Social in Colombia; ADEMI in the Dominican Republic; Financiera Calpiá in El Salvador; Compartamos in México; and ACP/MiBanco in Perú. Worldwide, the best-known MFOs are the Grameen Bank of Bangladesh and the *unit desa* system of Bank Rakyat Indonesia (Yaron, Benjamin, and Piprek, 1997; Christen *et al.*, 1995; Yaron, 1994). Grameen and BRI reach millions of depositors and borrowers, and many if not most are poor women. A survey of 200 of the thousands of MFOs worldwide found 13 million loans worth \$7 billion outstanding as of September 1995 (Paxton, 1996).

Although microcredit has claimed more and more of the aid budget, it may not always be the best way to help the poorest (Buckley, 1997; Rogaly, 1996). The fervor for microcredit may siphon funds from other projects that might help the poor more. Governments and donors should know whether the poor gain more from more small loans than from, for example, more health care, food aid, or cash gifts.

Are public funds for microcredit wasted or worthwhile? No one knows. Most measures of the impact of MFOs fail to control for what would have happened in their absence (Sebstad, Barnes, and Chen, 1995; Von Pischke and Adams, 1980). If users borrow more than once, then they must get benefits. The question, however, is not whether MFOs are better than nothing for their users. The question is whether MFOs are better than some other development project for the poor as a whole.

We construct a theoretical framework for rigorous thought about the social worth of an MFO. The framework puts the standard theory of project analysis in terms of the jargon of microcredit. By defining precisely the social worth of service to the poorest, the framework helps to judge the trade-offs between service to the poorest and service to others. The goal is to render more explicit the judgements used to allot funds.

We also address three empirical questions with evidence from a comparison of the poverty of a treatment group—borrowers of five MFOs in La Paz, Bolivia—with the poverty of a control group—the population of La Paz. The first empirical question is whether MFOs reach the poorest of the poor (Gulli, 1998; Hulme and Mosley, 1996).

We find that the five MFOs in Bolivia most often reached not the poorest of the poor but rather those just above and just below the poverty line. The theoretical framework lays out the conditions under which the MFOs may still have been a good way to help the poor.

The second question is whether group loans reach the poorest better than individual loans. While the theory is well-known (Conning, 1997; Sadoulet, 1997), less is known about when the assumptions of theory hold in practice. We find that group lenders in Bolivia reached the poorest better than individual lenders.

The third question is whether rural MFOs reach the poorest better than urban MFOs. Rural poverty is both wide and deep, but, compared with urban MFOs, rural MFOs must deal with more seasonality, worse information, greater risks, less smooth cash flows, longer distances, more diversity, and sparser populations. We find that the share of the poorest in the portfolio was highest for rural MFOs. We also find that since the urban MFOs had more borrowers, the share of the urban poorest who were borrowers exceeded the share of the rural poorest who were borrowers.

Section 2 defines *outreach*. Section 3 briefly describes the empirical methods. Section 4 compares the distribution of an index of the fulfillment of basic needs for borrowers with the distribution of a similar measure for the population. Section 5 concludes.

## 2. A theoretical framework of outreach

Judgements of the performance of MFOs have been based on the concepts of outreach and sustainability (Yaron, 1994). Here, we express outreach and sustainability in terms of the theory of social welfare. The purpose is to reconcile the jargon of microcredit with the standard tools of project analysis (Gittinger, 1982).

*Outreach* is the social value of the output of an MFO in terms of depth, worth to users, cost to users, breadth, length, and scope. Outreach is commonly proxied by the sex or poverty of borrowers, the terms of loan contracts, the price and transaction costs borne by borrowers, the number of borrowers, the financial strength of the MFO, and the number of products offered, including deposits.

*Sustainability* is permanence. The social goal is not to have sustainable MFOs but rather to maximize expected social value less social cost through time. In principle, sustainability is not necessary nor sufficient for social optimality. In practice, however, sustainable MFOs tend to improve welfare the most. Most unsustainable MFOs inflict costs on the poor in the future in excess of the gains enjoyed by the poor now. Sustainability is not an end but rather a means to the end of improved social welfare.

Thus outreach stands for the social value of loans from an MFO, and sustainability helps to maximize expected social value less social cost through time, including the surplus of users from loans and deposits, the profits or losses of the MFO, and the social opportunity cost of the resources used by an MFO. Sustainability affects

outreach since permanency tends to lead to structures of incentives and constraints that prompt all the groups of stakeholders in an MFO to act in ways that increase the difference between social value and social cost.

In principle, a complete analysis of an MFO would use cost-benefit analysis or cost-effectiveness analysis to compare social value with social cost in general equilibrium. In practice, it is so expensive to measure social value and social cost that almost all talk proceeds in terms of outreach and sustainability in partial equilibrium.

## **2.1 Six aspects of outreach**

### **2.1.1 Depth**

*Depth of outreach* is the value that society attaches to the gains from the use of microcredit by a given borrower. Since society places more weight on the poor than on the rich, poverty is a good proxy for depth. For example, society likely values the gains of a small loan to a street kid or a widow more than the same gains for a richer person.

Deeper outreach usually increases not just social value but also social cost. As income and wealth decrease, it costs more for a lender to judge the risk of a loan. This happens since, compared to the rich, the poor are more heterogeneous and less able to signal their ability and willingness to repay (Conning, 1998). Fixed costs also matter more for the poor since their loans are smaller and have more frequent installments.

Deeper outreach increases just social value and not social cost when an MFO finds better ways to judge risk at a cost less than the savings from the better

judgement. Such progress increases access, the ability and willingness to borrow and to repay at a price that covers the long-run cost of an efficient producer. Access is the nexus of *creditworthiness*—demand based on ability and willingness to repay—and the lending technology—supply based on an efficient way to judge creditworthiness. More access is progress since loans depend more on creditworthiness and less on the constraints of the MFO to judge creditworthiness. For example, an MFO that does not need physical collateral to judge creditworthiness could serve poorer users and thus have deeper outreach, all else constant, than an MFO that requires physical collateral.

### **2.1.2 Worth to users**

*Worth of outreach to users* is how much a borrower is willing to pay for a loan. Worth depends on the loan contract and on the tastes, constraints, and opportunities of the user. With the cost to the user constant, more worth means more surplus.

### **2.1.3 Cost to users**

*Cost of outreach to users* is the cost of a loan to a borrower. This is distinct from the cost of a loan to society or from the cost of a loan to an MFO. Cost to users includes both price and transaction costs. Price includes interest and fees. Prices paid by the user are revenues for the MFO. Transaction costs are non-price costs. They include both non-cash opportunity costs—such as the value of the time to get and repay a loan—and loan-related cash expenses such as transport, documents, food, and taxes. Transaction costs borne by the user are not revenues for the MFO.



The three aspects of depth, worth to users, and cost to users are tightly linked but still distinct. *Surplus* is the difference between worth to a user and cost to a user. It is the highest cost that the borrower would agree to bear to get the loan, less the cost that the borrower does in fact bear. In turn, depth of outreach reflects the social value attached to the surplus of a specific person. For example, \$100 of surplus for a poor person may be worth more to society than \$500 of surplus for a rich person.

Costs to users can be measured as the present value of the cash flows associated with a loan, loan-related cash expenses, and time spent. Worth to users is more difficult to measure. Still, the relative worth of two or more loan contracts can be compared through their terms. If a borrower has alternative sources of loans, then surplus can be measured as the cost savings of a switch to an MFO.

#### **2.1.4 Breadth**

*Breadth of outreach* is the number of users. Breadth matters since the poor are many but the aid dollars are few.

#### **2.1.5 Length**

*Length of outreach* is the time frame in which an MFO produces loans. Length matters since society cares about the welfare of the poor both now and in the future. Without length of outreach, an MFO may improve social welfare in the short term but wreck its ability to do so in the long term.

In theory, an MFO can have length of outreach without sustainability if it had a fixed budget or an unending source of public support (Morduch, 1998a). In principle, such an MFO could live a long time. In practice, however, longer outreach through sustainability usually strengthens the incentives that serve to maximize expected social value less social costs through time. Without length, borrowers have few selfish reasons to repay since the MFO cannot promise to lend in the future. Loan losses shorten length of outreach in a downward spiral. Likewise, lack of profits prompts employees to strip the MFO bare and to bask in perks before the chance is gone.

#### **2.1.6 Scope**

*Scope of outreach* is the number of types of financial contracts offered by an MFO. In practice, the MFOs with the best outreach produce both small loans and small deposits. Deposits matter for two reasons. First, all poor people are depositworthy and save to smooth consumption, finance investment, and buffer risk. Fewer poor people are creditworthy. Second, deposits strengthen the incentives for sustainability and length of outreach. Depositors shun MFOs if they do not expect them to live to return their deposits. To attract and keep deposits, an MFO must please not donors and government but rather users and regulators.

### **2.2 Trade-offs and feedback among the six aspects of outreach**

Depth is the social value of worth to users less cost to users. Breadth counts users, length counts years of service, and scope counts types of contracts. The proxies

are useful since direct measures of the social value of the output of an MFO are expensive. Outreach is the worth less cost of users, weighted by depth, summed across breadth of users and scope of contracts, and discounted through length of time.

Social welfare depends on depth, worth, cost, breadth, length, and scope, but the greatest of these is length. In particular, more length in the short term requires more profit. This means higher prices, more cost to users, and less surplus per user. In the long term, however, the trade-off may vanish if the push for length leads to innovations in technology and organization that increase profits and/or increase worth to users without parallel increases in social cost or in cost to users. Increased length feeds back to decrease social cost since users have more selfish reasons to repay. More scope also increases worth to users and strengthens the incentives that boost length.

The debate over the social value of sustainability hinges on the effect of length. MFOs that do not aim for sustainability believe that the short-term increase in surplus caused by low prices swamps the effects of reduced length from low profits. MFOs that aim for sustainability believe the converse.

The rest of this paper looks at evidence of depth of outreach for five MFOs in Bolivia. Even if society cares just for the poorest, however, the theoretical framework highlights that social welfare depends on more than just depth. Breadth affects the number of the poorest served, and cost and worth to users affect surplus. The poorest can use not just loans but also deposits, not just now but also in the future.

### **3. Poverty of borrowers from five Bolivian MFOs**

#### **3.1 The five Bolivian MFOs**

By Latin American standards, Bolivia is a poor country. GNP per capita in 1995 was about \$700 (World Bank, 1996). The income distribution was highly skewed, and rural households in particular were very poor (UNDP, 1996). Still, Bolivia is a flagship for microcredit in Latin America and in the world.

At the end of 1995, two of the five Bolivian MFOs studied were regulated and three were NGOs. BancoSol was a bank that came from an NGO. Caja de Ahorro y Préstamo Los Andes was a regulated non-bank. The three NGOs were Centro de Fomento a Iniciativas Económicas (FIE), Fundación para la Promoción y Desarrollo de la Microempresa (PRODEM), and Fundación Sartawi.

The five MFOs can be grouped by their lending technology and by their geographic market niche. In lending technology, BancoSol and PRODEM lend to groups, and FIE and Caja Los Andes lend to individuals. Sartawi lends both to groups and to individuals. In geographic market niche, PRODEM and Sartawi are mostly rural, while BancoSol, FIE, and Caja Los Andes are mostly urban. Thus BancoSol lends to urban groups, PRODEM lends to rural groups, and Caja Los Andes and FIE lend to urban individuals. Sartawi lends to rural groups and rural individuals.

The five MFOs have some traits in common. They all work in niches untouched by traditional banks. All five grant small loans to first-time borrowers and make bigger

loans to repeat borrowers. All five charge high prices, and all five keep arrears and loan losses low with various mixes of screening, monitoring, and contract-enforcement. All five have received grants, free technical assistance, and low-priced loans from donors, but all five have also made progress toward sustainability. Compared with peers (*Microbanking Bulletin*, 1998), all five have uncommon outreach and sustainability.

Bolivia, while sparsely peopled, may have the densest microcredit in the world. The five MFOs studied here are the most important of the about 30 in Bolivia. They account for more than half of both clients and portfolio outstanding (*La Razón*, 1997).

## **3.2 The data**

In November and December of 1995, we surveyed a random sample of 622 of the more than 52,000 borrowers active in the five MFOs at the end of September in the urban areas in and near La Paz and in the rural Altiplano near Lake Titicaca. Of the 588 observations with complete data, 221 came from BancoSol, 124 from Caja Los Andes, 91 from FIE, 83 from Sartawi, and 69 from PRODEM. The survey included some questions from a 1992 census (Ministerio de Desarrollo Humano, 1995).

## **3.3 An index of fulfillment of basic needs**

### **3.3.1 Conceptual issues**

A vast literature explores ways to measure poverty (Lipton and Ravallion, 1995). Here, we matched some questions in our survey of borrowers with census

questions used in a national poverty assessment. The questions measured the use by a household of goods and services thought to be linked with the fulfillment of basic needs.

The answers were condensed in an Index of Fulfillment of Basic Needs. This approach is common in Latin America. It requires (Boltvinik, 1994):

- (a) Theoretical definitions of basic needs and ways to satisfy them;
- (b) Choices of observable proxies that indicate degrees of fulfillment;
- (c) Norms that define the point where a need is considered unsatisfied;
- (d) Aggregation of indicators to construct an index; and
- (e) Choice of the poverty line for the index.

### **3.3.2 Empirical issues**

The nationwide assessment chose the indicators, their norms, and the poverty line (Ministerio de Desarrollo Humano, 1995). In most cases, the norm was the median of an indicator, but some cases had more complex norms. Like all measures of absolute poverty, the poverty line and the norms were at least somewhat arbitrary. The index was computed not for individuals but for households. It had four parts:

1. Housing:
  - (a) Type of materials used for floors, walls and roof;
  - (b) Number of people per room.
2. Access to public services:
  - (a) Source of water;
  - (b) Type of sewage system;
  - (c) Access to electricity;
  - (d) Type of fuel used to cook food.
3. Education:

- (a) Years of school completed;
  - (b) Current attendance in school;
  - (c) Literacy.
4. Access to health services:
- (a) Use of formal health care;
  - (b) Use of informal health care.

Except for sewage, the urban and rural norms were the same. The Index of Fulfillment of Basic Needs (IFBN) was the simple average of the ratios of the four observed indicators  $x_j$  to their norms  $x_{jnorm}$ :

$$IFBN = \left( \frac{1}{4} \right) \cdot \sum_{j=1}^4 \frac{x_j}{x_{jnorm}}. \quad (1)$$

The range of the ratio of  $x_j$  to  $x_{jnorm}$  depended on the range of answers in the nationwide assessment. The indicator for education was the average of indices for individual members of a household:

$$IE = \left( \frac{1}{N} \right) \sum_{i=1}^N \left( \frac{y_i + s_i}{y_{inorm} + s_{inorm}} \right) \cdot L_i, \quad (2)$$

where

- IE = Index of education of the household;
- N = Number of members of the household;
- $y_i$  = Years of schooling for person i;
- $s_i$  = School attendance dummy for the age of person i;
- $y_{inorm}$  = Norm for years of schooling for the age of person i;
- $s_{inorm}$  = Norm for attendance for the age of person i; and
- $L_i$  = Literacy dummy for person i.

The nationwide assessment set the poverty line at an IFBN of 0.9. Households below this were *poor*, and the rest were *non-poor*. The non-poor were sub-classified as *fulfilled or threshold*. The poor were sub-classified as *moderate* or *poorest*.

The survey of borrowers included 56 percent of the indicators in the nationwide IFBN. Most of what was omitted had to do with access to health care. We believe this is highly correlated with the other indicators, so the comparison should not be biased.



## **4. Evidence of depth of outreach from Bolivia**

### **4.1 The population of La Paz**

The shares of the population of urban and rural La Paz in each of the four poverty classes are in Table 1 on page 32. Two features stand out. The first is the extent of poverty. In 1992, more than half the urban households were poor, and almost all rural households were poor. The second is the depth of rural poverty. Not only were 96 percent of rural households poor, but 74 percent were among the poorest. In contrast, 17 percent of the urban households were in the poorest class. Poverty in Bolivia, especially rural poverty, was broad and deep.

### **4.2 Borrowers of the five MFOs**

#### **4.2.1 Distribution of the IFBN**

A box-and-whisker plot (Tukey, 1977) depicts the distribution of the IFBN for borrowers of the five MFOs (Figure 1 on page 31). We do not have data for a similar picture for the rural and urban populations. The IFBN is on the vertical axis. The poverty line is at 0.9. The MFOs are ordered from shallowest to deepest outreach.

The width of each box reflects the sample size for each MFO. The box for BancoSol ( $n=221$ ) is wider than the box of PRODEM ( $n=69$ ).

The height of the boxes marks the interquartile distance, the range between the second and third quartiles of the distribution. Less-disperse distributions have shorter

boxes. For example, the box for PRODEM is shorter than the box for Sartawi since the distribution of PRODEM is more clustered near the median.

The whiskers beyond the boxes bracket either the extreme points in the data or 1.5 times the interquartile distance from the median, whichever is less. In a Gaussian distribution, more than 99 percent of the data are inside the whiskers. The horizontal lines beyond the whiskers mark outliers.

The light horizontal line in each box is the estimated median, and the grey trapezoids bound its 95-percent confidence interval. FIE had the highest median. Half the sample of FIE had an IFBN of more than 1.02, and the other half had an IFBN of less than 1.02. A Kolmogorov-Smirnov test rejected the hypothesis that any of the distributions were Gaussian, so differences in medians were tested non-parametrically with Wilcoxon rank-sums (Hollander and Wolfe, 1973). The median of FIE (1.02) is greater than that of Caja los Andes (0.97) with more than 95 percent confidence. The borrowers of these two urban individual lenders clustered just above the poverty line in the threshold class. The median for BancoSol, the urban group lender, was at the poverty line (0.90). This is less than the other two urban medians with more than 99 percent confidence. The median rural borrowers in Sartawi (0.71) and in PRODEM (0.67) were moderately poor. The rural medians were statistically smaller than the urban medians, but they were not statistically different from each other.

The Wilcoxon tests for differences in medians, as well as non-parametric Kolmogorov-Smirnov tests for differences in the distributions of the IFBN for each of the five MFOs, suggest the same pattern of three depths of outreach:

- (a) Threshold group (FIE and Caja los Andes);
- (b) Poverty-line group (BancoSol); and
- (c) Moderately poor group (PRODEM and Sartawi).

#### **4.2.2 Distribution of the IFBN for borrowers versus the population**

We compare the estimated distribution of the IFBN among the poverty classes for the sample of borrowers from the five MFOs with the known distribution of a similar measure for all urban and rural households in La Paz (Table 1 on page 32). Since the share of borrowers in a poverty class is a random variable, we report non-parametric bootstrapped 90-percent confidence intervals (Efron and Tibshirani, 1993).

We do not expect the sample and population distributions to match since creditworthiness and demand for microcredit depend on income and assets. All else constant, lenders can judge creditworthiness for rich people easier than for poor people. Suppose an MFO drew borrowers at random from the subset of the population that, given a lending technology, had demand and was creditworthy. Then the profile of borrowers, compared with the population, would be skewed toward the rich.

We do not know the exact profile of demand and creditworthiness in Bolivia. Still, we can answer four useful questions. The first asks whether the poorest had the same share in the portfolio as in the population. The second asks how many of the

poorest were reached. The third and fourth questions ask how depth compared between group and individual loan technologies or between rural and urban market niches.

### **4.3 Depth of outreach to the poorest of the poor**

This section analyzes the share of the poorest in the portfolios of the five MFOs and in the population. It also analyzes the number of the poorest reached.

#### **4.3.1 The share of the poorest in the portfolio and in the population**

Of all households in urban La Paz, 45 percent were non-poor (Table 1 on page 32). For all three urban MFOs, the point estimate of the share of non-poor households exceeded the population parameter: 69 percent for FIE, 67 percent for Caja Los Andes, and 48 percent for BancoSol. The population parameter is within the 90-percent confidence interval for BancoSol but not for FIE and Caja los Andes. In rough terms, this means we can reject the hypothesis that FIE and Caja los Andes reached non-poor borrowers in proportion to their population share, but we cannot reject it for BancoSol. All three urban lenders had a statistically bigger share of threshold borrowers than did the population. Caja los Andes and BancoSol had a smaller share of borrowers in the fulfilled class than did the population, and FIE had a bigger share.

For the moderately poor, the share was lower in FIE and in Caja los Andes (both 29 percent) than in the population (38 percent). The share for BancoSol was higher than in the population (47 percent). For the poorest, the shares of all three urban lenders (2 to 5 percent) were smaller than in the population (17 percent). Thus,

compared to the population, the urban lenders lent less to the fulfilled and to the poorest and more to the richest of the poor (threshold) and, in the case of BancoSol, to the poorest of the rich (moderate).

The same pattern holds in rural La Paz. The non-poor were 5 percent of all rural households but 14 percent of PRODEM and 13 percent of Sartawi. In all rural households, 22 percent were moderately poor, and 74 percent were among the poorest. For PRODEM, 54 percent were moderately poor, and 33 percent were among the poorest. For Sartawi, 49 percent were moderately poor, and 36 percent were among the poorest. All the differences are statistically significant.

Except for the fulfilled class and for the moderately poor in BancoSol, the profile of borrowers of each of the five MFOs is skewed toward the threshold class, compared with the profile of the population. This does not prove much, however, about depth of outreach. What matters is not whether the MFOs reached the poorest of the poor but whether the MFOs reached the poorest of those who demanded loans and were creditworthy. We do not have the data needed to answer this question.

#### **4.3.2 The number of the poorest in the portfolio**

If an MFO has broad outreach, then it might reach many of the poorest even though they are not a big share of the portfolio (Rosenberg, 1996). Point estimates of the number of total borrowers in each of the poverty classes are in Table 2 on page 33.

The numbers are the point estimates of the share of the portfolio in a poverty class multiplied by the total number borrowers in these MFOs in La Paz.

The five MFOs reached about 4,500 of the poorest, 1,900 urban and 2,600 rural. This number depends on the relative share of the poorest in a portfolio and the absolute size of the portfolio. For example, the share of the poorest was about 4 percent in Caja Los Andes and about 5 percent in BancoSol. With about 30,000 total borrowers, BancoSol served about 1,400 of the poorest, while Caja los Andes, with 9,200 total borrowers, served about 370. FIE, with the lowest share of the poorest and the smallest urban portfolio, had about 120 borrowers among the poorest.

The rural MFOs were much smaller than the urban MFOs, but the share of the poorest in their portfolios was much higher. The effect of the greater share swamped the effect of the smaller portfolio. PRODEM, with about 2,500 borrowers in rural La Paz, served about 800 of the poorest, more than twice as much as Caja los Andes. Sartawi, with about 4,900 borrowers, had about 1,800 were among the poorest. This is 400 more than BancoSol and almost as many as in the three urban MFOs combined.

About 4,500 of the poorest households in La Paz had debt from the five MFOs in late 1995. Is this deep outreach? One way to check is *market penetration*, the ratio of borrowers in a given class in a given MFO to the number of households in that class in the population (Table 3 on page 34). In 1992, La Paz had about 260,000 urban households and about 160,000 rural households (Ministerio de Desarrollo Humano, 1995). FIE reached about 2 percent of all urban households, Caja los Andes 4 percent,

and BancoSol 12 percent. Of all rural households, about 1 percent had debt with PRODEM, and about 2 percent had debt with Sartawi.

Penetration in the market as a whole matters less than penetration in that part of the market with demand and creditworthiness. As before, we lack this data. Still, we know that urban lenders reached 38 percent of threshold households, 19 percent of moderately poor households, and 18 percent of all households. Given that not all households want debt at all times, that not all households can repay loans, and that there are other MFOs in urban Bolivia, this suggests scant room for more market penetration in urban areas. The amount of slack in rural areas is less certain. There, 12 percent of the non-poor and 5 percent of the poor had debt at the time of the survey. This market penetration is much less than by the urban MFOs, but we do not know how much is possible since rural microcredit is more difficult than urban microcredit.

The five Bolivian MFOs reached the richest of the poor and the poorest of the rich much more than they reached the poorest of the poor. This does not necessarily mean that the MFOs did a bad job. A loan that is not repaid is a gift. While there is nothing wrong with a gift, a gift in loans' clothing may backfire (Krahn and Schmidt, 1994; Adams, Graham, and Von Pischke, 1984). Also, outreach depends not just on depth for the poorest but also on breadth, worth to users, cost to users, length, and scope for all households. These MFOs have uncommon breadth, worth, cost, and length. BancoSol and Caja los Andes take deposits and so have especially wide scope.

#### **4.4 Depth by loan technology**

Sine both rural MFOs use group loans, we compare technology just for the urban MFOs so as not to confound the effects of technology with the effects of market niche. Compared to the individual lenders FIE and Caja los Andes, the group lender BancoSol had the smallest shares in the fulfilled and threshold classes and the biggest shares in the moderate and poorest classes (Figure 1 on page 31; Table 1 on page 32). BancoSol also had the most market penetration with almost one-fourth of the threshold class and 15 percent of the moderately poor (Table 3 on page 34).

In general, the group-lending technology has more potential for deep outreach since it can substitute joint liability for physical collateral. Joint liability has high transaction costs, and it can also have high cash costs if borrowers must repay the debts of their comrades. Still, it attracts those who cannot or will not put up physical collateral. In contrast, individual lenders appeal to richer borrowers who can offer physical collateral and who want to avoid the other costs of joint liability.

BancoSol had both the deepest and the broadest outreach of the urban lenders. This does not necessarily mean that BancoSol had the best outreach overall since the comparison ignores cost to users, worth to users, length, and scope.

#### **4.5 Depth by geographic market niche**

At first glance, rural lenders seem to have deeper outreach than urban lenders (Table 1 on page 32). About 86-87 percent of the rural borrowers were among the poor,



compared to 31-52 percent for urban borrowers. In fact, this comparison is not valid since it does not control for the different urban and rural distributions of poverty.

Table 4 on page 35 controls for this. Each cell is the share of the portfolio in a given poverty class for a given MFO divided by the share of the population in the poverty class from Table 1 on page 32. A ratio of more than 1 means the share of clients in that class was greater than the share of the population in that class. A ratio of less than 1 means the opposite.

If the poor were more concentrated in an MFO than in the population, then the ratios would increase from less than 1 in the leftmost columns to more than 1 in the rightmost columns. In fact, the pattern is the opposite (Table 4 on page 35). For all five MFOs, the ratios start near or above 1 in the leftmost column for the fulfilled and exceed 2 for the threshold class. The ratios decrease to the right for the moderately poor and still more for the poorest. As seen before, the profile of borrowers was skewed, not toward the poorest but toward those near the poverty line.

The details of the broad pattern differ, however, for rural and urban MFOs. For example, in the threshold class, no urban lender had a ratio above 3.0, while the ratio for PRODEM was 4.8 and for Sartawi was 4.4. The rural MFOs mined the few non-poor households more intensely than the many poor households.

Among the moderately poor and the poorest, the rural lenders had higher ratios and thus deeper outreach than the urban lenders. This is a puzzle. If rural lending is more difficult than urban lending, then why did rural lenders have more depth? The

answer is probably that the urban lenders had not yet exhausted their non-poor niches. In contrast, the rural lenders were pushed to the poorest since they do not have as many non-poor borrowers to serve. For rural MFOs, the ratios of the share of the threshold class to the population share is 4.8 and 4.4, and the ratios for the moderately poor class are 2.4 and 2.2. For urban MFOs, the threshold ratios are about 2 or 3, and the moderate ratios are near 1. The rural lenders serve the richest of the poor and the poorest of the rich much more intensely than the urban lenders. The absolute number of rural non-poor households is small, however, and so the rural MFOs turn sooner and more often to the most difficult of all clienteles, the rural poorest. The greater depth of the rural MFOs suggests that the urban MFOs may not reach all of the urban poorest who are creditworthy and who want loans.

In terms of market penetration (Table 3 on page 34), the two urban individual lenders, FIE and Caja los Andes, had about 1 and 2 percent of the poorest households in their portfolios. The urban group lender, BancoSol, served about 3 percent of the poorest. In rural La Paz, PRODEM reached about 2 percent of the poorest, and Sartawi reached about 4 percent of the poorest. Overall, about 4 percent of the urban poorest used MFOs, and about 2 percent of the rural poorest used MFOs. Thus the average rural borrower was more likely to be a member of the poorest than the average urban borrower, but the average urban household among the poorest was more likely to be a borrower than the average rural household among the poorest.

## 5. Summary and conclusions

We analyzed the depth of outreach of five MFOs in La Paz, Bolivia. The first step was to construct a theoretical framework in which depth is one of six aspects of outreach. The second step was to compare the poverty of a sample of the borrowers of the five MFOs with the poverty of all the households in La Paz.

We found five main results. First, improved social welfare from microcredit depends not just on depth of outreach but also on worth to users, cost to users, breadth, length, and scope. Length matters most since the drive for length leads to incentives that prompt improvements in the other aspects. Second, the MFOs in La Paz tended to serve not the poorest but rather those near the poverty line. Most MFOs will probably serve this same niche. Few of the poorest are creditworthy and demand loans, and many of the non-poor can borrow elsewhere. Third, the distribution of demand and creditworthiness unconditional on supply is unknown, so we cannot say whether the Bolivian MFOs had deep outreach in an absolute sense. Fourth, group lenders in La Paz had deeper outreach than individual lenders. In general, group technologies will have the most potential for deep outreach since they substitute joint liability for the physical collateral that the poorest may not own. Fifth, the rural MFOs in La Paz had deeper outreach than the urban MFOs in the sense that the typical rural borrower was more likely to be among the poorest. At the same time, the urban MFOs had more market penetration among the poorest due to their bigger portfolios.

These results on depth of outreach do not tell whether the five MFOs did well in terms of all six aspects of outreach. On the one hand, it may be that the drive for length and breadth is what prompted these MFOs to grow and to have some depth. On the other hand, perhaps these MFOs would have reached more of the poorest had they stayed small and unprofitable with a single-minded focus on depth. The theoretical framework described here can help to make more explicit the judgements used to choose which focus to take. This can only help to improve social welfare.

The empirical results sketch some of the limits of microcredit for the poorest of the poor. They highlight the need for more scrutiny of the flood of funds budgeted in the name of access to loans for the poorest. Even when microcredit does reach the poorest, it may not increase incomes as much as smooth consumption (Mosley and Hulme, 1998; Morduch, 1998b). Even if it turns out that MFOs do not reach relatively or even absolutely many of the poorest, this shallow depth may be more than balanced by the use of MFOs by those near the poverty line.

Microcredit may or may not be a good development gamble. If donors and governments have social welfare in mind, then they should check whether microcredit is the best way to spend public funds earmarked for development. Is microcredit worthwhile or worthless? The theoretical framework here is a better way to judge this than simple measures of the number of the poorest served by an MFO.

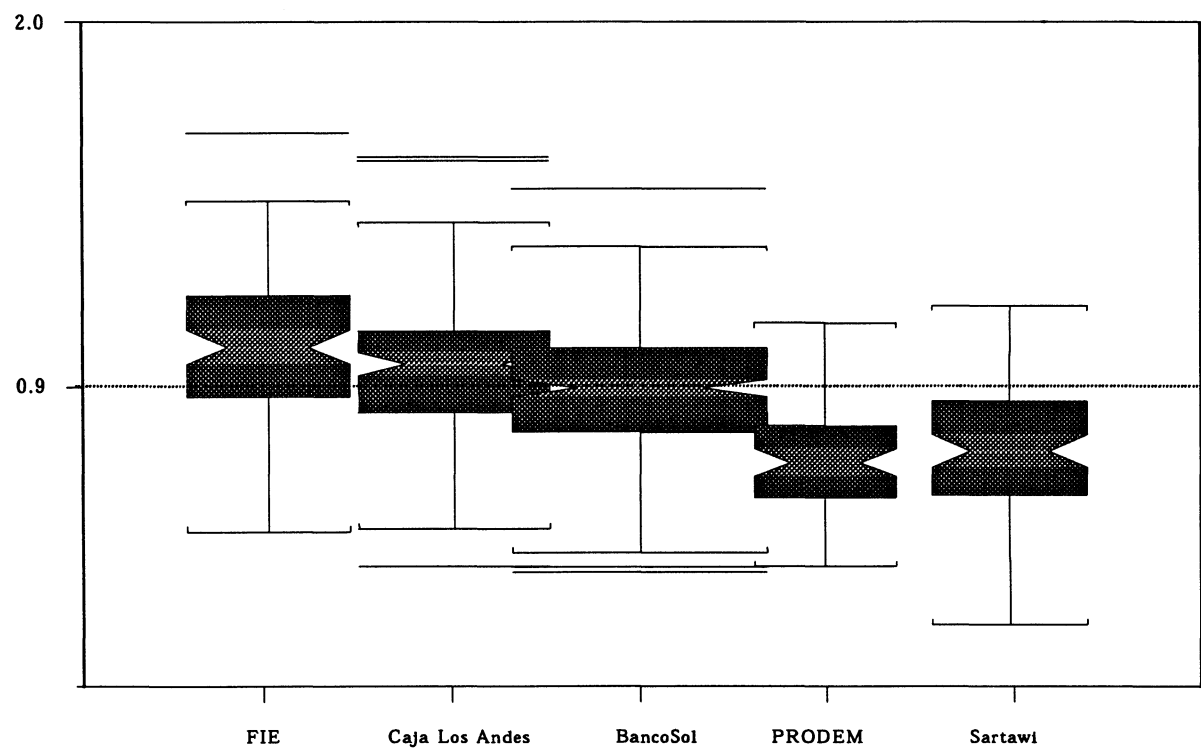
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IFBN



**Figure 1: Box-and-whisker plot of the distribution of the IFBN for sampled borrowers from the five MFOs**



Range of index	n	Non-poor			Poor		
		Fulfilled 2.0 to 1.1	Threshold 1.1 to 0.9	Sub-total 2.0 to 0.9	Moderate 0.9 to 0.6	Poorest 0.6 to 0.0	Sub-total 0.9 to 0.0
Urban La Paz	436	<b>28</b>	<b>17</b>	<b>45</b>	<b>38</b>	<b>17</b>	<b>55</b>
FIE	91	26— <b>35</b> —44	25— <b>34</b> —43	62— <b>69</b> —77	21— <b>29</b> —36	0— <b>2</b> —5	23— <b>31</b> —38
Caja Los Andes	124	14— <b>19</b> —25	40— <b>48</b> —55	60— <b>67</b> —73	23— <b>29</b> —35	2— <b>4</b> —7	27— <b>33</b> —40
BancoSol	221	12— <b>16</b> —20	27— <b>33</b> —38	43— <b>48</b> —54	42— <b>47</b> —52	2— <b>5</b> —7	46— <b>52</b> —57
Rural La Paz	152	<b>2</b>	<b>3</b>	<b>5</b>	<b>22</b>	<b>74</b>	<b>96</b>
PRODEM	69	0— <b>0</b> —0	6— <b>13</b> —20	6— <b>13</b> —20	43— <b>54</b> —64	24— <b>33</b> —43	80— <b>87</b> —94
Sartawi	83	0— <b>2</b> —5	7— <b>12</b> —18	8— <b>14</b> —20	40— <b>49</b> —58	28— <b>36</b> —45	80— <b>86</b> —92

All figures are percentages. Point estimates and census parameters are in boldface, and 90-percent confidence bounds for the point estimates are in regular font. The figures for the population of urban and rural La Paz do not have confidence intervals since they are not estimates but rather parameters from a census (Ministerio de Desarrollo Humano, 1995). The figures for the MFOs were computed from the survey by the authors. Rows may not sum to 100 due to rounding.

**Table 1: Point estimates and bootstrapped non-parametric 90-percent confidence intervals for the distribution of the Index of Fulfillment of Basic Needs among poverty classes for borrowers from five MFOs in La Paz, Bolivia, and for all households in urban and rural La Paz**

	Non-poor			Poor			Total
	Fulfilled	Threshold	Sub-total	Moderate	Poorest	Sub-total	
Urban La Paz	8,500	16,000	25,000	18,000	1,900	20,000	45,000
FIE	1,900	1,900	3,900	1,500	120	1,600	5,500
Caja Los Andes	1,800	4,400	6,200	2,700	370	3,000	9,200
BancoSol	4,800	9,800	15,000	14,000	1,400	15,000	30,000
Rural La Paz	120	1,000	1,100	3,700	2,600	6,300	7,400
PRODEM	0	360	360	1,300	800	2,100	2,500
Sartawi	120	650	770	2,400	1,800	4,200	4,900
Total La Paz	8,600	17,000	26,000	22,000	4,500	26,000	52,000

Survey by the authors and Table 1. Rows and columns may not sum to totals due to rounding

**Table 2: Estimated breadth of outreach by number of clients in a poverty class for borrowers from five MFOs in urban and rural La Paz**

	Non-poor			Poor			Total
	Fulfilled	Threshold	Sub-total	Moderate	Poorest	Sub-total	
Urban La Paz	12	38	22	19	4	14	18
FIE	3	5	3	2	0.3	1	2
Caja Los Andes	3	10	5	3	0.8	2	4
BancoSol	7	23	13	15	3	11	12
Rural La Paz	5	15	12	11	2	4	5
PRODEM	0	0.2	0.07	1	2	2	1
Sartawi	0.2	2	0.7	2	4	3	2

All figures are percentages computed from Tables 1 and 2 and from Ministerio de Desarrollo Humano (1995). Numbers may not sum totals due to rounding.

**Table 3: Market penetration by poverty class for five MFOs in La Paz**

	Non-poor			Poor		
	Fulfilled	Threshold	Sub-total	Moderate	Poorest	Sub-total
Urban La Paz						
FIE	1.2	2.1	1.6	0.7	0.1	0.5
Caja Los Andes	0.7	2.9	1.5	0.8	0.2	0.6
BancoSol	0.6	2.0	1.1	1.2	0.3	0.9
Rural La Paz						
PRODEM	0.0	4.8	3.2	2.4	0.5	0.9
Sartawi	1.6	4.4	3.5	2.2	0.5	0.9

Computed from Table 1 as described in the text.

**Table 4: Ratios of the IFBN for clients of the five MFOs to the IFBN for the urban or rural population near La Paz**